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**Gender stereotypes in technology use:
a content analysis of Mr. Robot**



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GENDER STEREOTYPES IN TECHNOLOGY USE: A CONTENT ANALYSIS OF *Mr. ROBOT*

ABSTRACT

The present research further develops the existing body of knowledge on the representation of gender stereotypes in the usage of technology in media. Gender and technology use are primarily studied in advertising. However, television fictions forms the largest share of audience's media diets. Therefore, the current study analysed how gender stereotypes with regard to technology are portrayed on television, focusing on the cyber-TV drama *Mr. Robot*. This program is of interest as its main theme is technology and in particular hacker culture. This study tests the hypotheses gathered from previous research about gender stereotypes in the usage of technology. The quantitative content analysis of *Mr. Robot* showed that gender stereotypes in relation to the usage of communicational technological devices such as computer, tablets and mobile phones are present. Exploring these results through the lenses of the social role theory (Eagly, 1987) led to the conclusion that, when it comes to using communicational technological devices, men and women are represented quite different. Male characters are portrayed to able to use technology with high skills, for instance hacking, whereas female characters are represented in general as less capable of using advanced CTDs and only a small minority of them are able to carry out difficult tasks with technology. Overall, in this contemporary television drama, men are represented as tech savvy compared to women, suggesting a male-dominated view of the usage of technology.

Key words: usage of technology, social role theory, content analysis, gender differences, gender stereotypes

Introduction

The current research aims to analyse gender stereotypes in relation to the usage of communication technological devices (CTD, i.e. tablets, mobile phones and computers) in media, particularly focusing on television. Previous psychological and sociological research has argued that gender roles are socially constructed (Howard, 2000; Williams & Best, 1982; Eagly, 1987; Eagly, Wood, & Diekman, 2000; Vogel, Wester, Heesacker & Madon, 2003; Fuegen et al 2004; Hoobler et al. 2009). Gender roles can be defined as the “shared expectations that apply to individuals on the basis of their socially identified sex” (Eagly, Wood, & Diekman, 2000, p. 127). These social expectations promoting ideals of appropriate behaviour for men and women are influenced and (re)produced by mass media such as television, advertisements, newspapers and personal experiences (Eagly, Wood, & Diekman, 2000; Connell, 2014). Hence, following this line of reasoning it can be argued that gender stereotypes are socially created.

In general, stereotypes have a negative connotation because they are restricting ideas about individuals, which can limit and hinder someone’s attempt in enhancing their rights and values (Eagly, Wood, & Diekman, 2000; Judge & Robbins, 2015). Gender stereotypes might be particularly harmful as they present a limited set of acceptable gender roles in society. Scholars, such as Judge and Robbins (2015), argued that the spread of gender stereotypes is likely to impact people’s way of thinking, because the diffusion of these ideas can lead to the creating of biased and superficial beliefs about female and male roles (Heilman, 2001). Thus, gender stereotypes can affect the perceptions of how men and women *should* behave and what the acceptable feminine and masculine abilities are (Eagly, Wood, & Diekman, 2000; Williams & Best, 1982).

As a consequence, gender stereotypes can very often be linked to sexual discrimination and inequity (Judge & Robbins, 2015). The negative effects of gender stereotypes have become increasingly visible with the rise of the mass media and the use of Communication Technology Devices (further CTD), marking a new area in which gender stereotypes are expressed and in which discrimination can occur (Dilevko & Harris, 1997; Bollinger, 2008; Judge & Robbins, 2015). Indeed, the dominant stereotypical ideas about technology are mostly masculine, thereby (re)constructing the image of man dominating the field of technology (Adam, 2003). By recognising men as the main experts in using technology (Dilevko, 1997; Kupfner, 1998; Bollinger, 2008), women’s possibilities can be limited in the field of technology. For instance, in pursuing a career in ICT, as it would imply that women do not have the necessary set of skills required for a job that is considered more “technical”. Thus, the diffusion of gendered stereotypical ideas about the usage of technology can have a significant impact on occupational segregation. Specifically, this can lead people to have prejudices about women’s abilities in using technology and discriminate against them for related jobs (Goodall, 2012; Anand, 2013). It is arguably, the most dangerous consequence of stereotypes in technology use.

It is commonly believed that the media have a great impact in creating meanings and beliefs about our society. Scholars have argued that media are particularly essential in the representation of gender roles (Hoobler, Wayne, Lemmon, 2009). Over the past decades, different academics showed that gender differences and stereotypes have been reinforced by popular culture (Ford, Voli, Honeycutt & Casey, 1998; Jones, 1991; Rao & Kelleher, 2003). According to this perspective, mass media such as advertising and television programs are very effective as communication channels: they can spread ideas and messages, and hence diffuse stereotypes.

Several academics, such as Signorielli and Bacue (1999), Dilevko (1997), and Bollinger (2008) studied the representation of gender in a wide range of mass media, predominantly focusing on advertisements and television as the main communicators of gender stereotypes. However, there is a lack of recent research about the representation of gender in the digital age in media. The only studies about gender stereotypes in technology have just paid attention to advertisements (Dilevko, 1997; Signorielli & Bacue, 1999; Signiorelli & Kahlenberg, 2001; Bollinger, 2008, Signorielli, 2009).

However, television dramas are also an important medium in the dispersion of messages about society for a number of reasons. Firstly, television dramas can reach a large-scale audience. Secondly, television is considered to be very effective in creating concepts about society, because it is a “storyteller” and an information conveyor (Gerbner, 1998; Gerbner et al., 2002; Linebarger & Piotrowski, 2009). Moreover, contrary to advertisements, television dramas allow people to observe gender roles on a long-term basis and thus identify with the characters (Signorielli & Kahlenberg, 2001). Hence, television can affect people more than advertisements do about the ideas of gender roles. For these reasons, the current research aimed to analyse television, as it has a heavy influence in creating meanings and manipulating people’s attitudes and opinions (Gerbner et al., 2002; Linebarger & Piotrowski, 2009). Moreover, this research aims to understand if there are differences in the portrayal of gender stereotypes in relation to the usage of technology between tech advertisings and cyber television programs. Therefore, studying gender stereotypes in relation to the usage of technology in television drama is very valuable.

In view of the reasons mentioned above, the current research aims to analyse gender stereotypes in relation to the usage of CTD in the cyber- TV drama *Mr. Robot*. This show is inspired by contemporary life and current events, for instance the Anonymous hacker group and the rise of hacker culture (Koblinjan, 2016). Therefore, *Mr. Robot* sets the opportunity to analyse the representation of gender stereotypes in relation to the usage of technology through different characters. The research question formulated for the current project is: *to what extent are gender stereotypes related to the usage of communication technological devices represented in the cyber TV-drama Mr. Robot?* The purpose of this research is to ascertain the differences between men and women in using CTD in the cyber TV drama. To achieve this, a quantitative method was used. More precisely, a systematic and objective

conceptualization of gender stereotypes in relation to the usage of CTD is developed through conducting a content analysis. By doing this, the analysis can offer an objective data-driven conclusion (Rourke & Anderson, 2004). Moreover, the goal of this study is to extend the existing body of knowledge about stereotypes in relation to technology by studying a medium accessible to a large-scale audience, which has not been examined before.

This paper is organised as follows. Firstly, it will review previous literature on the concepts of sex, gender and gender stereotypes. Secondly, the social role theory will be briefly explained, in light of a discussion of previous research on gender stereotypes in the usage of technology. Thirdly, it will develop a research design to examine gender stereotypes in the usage of CTD in the cyber TV drama *Mr. Robot*, providing a description and justification for the research method, data collection and data analysis. Finally, the findings will be presented followed by a discussion of the main relevant results and suggestions for future research.

Sex, gender and gender stereotypes

The concepts of gender and gender stereotypes are heavily studied in sociology and media studies. Sociologists make a distinction between the concept of *sex* and *gender*. On the one hand, the term *sex* is linked to biological traits focused on chromosomes and genitalia and some physical features that distinguish the category of male and female (Eagly, 1987; Connell, 2014). On the other hand, the concept of *gender* is the result of the cultural meanings attached to men and women's roles, and how individuals understand their identities (Eagly, Wood, & Diekman, 2000; Oakley, 2015). Therefore, the term *gender* entails social norms, attitudes and activities that society considers more appropriate for one sex over another.

The understandings created by society about gender roles provide the basics of gender stereotypes. Gender stereotypes are constructed from the observations of what people do in everyday life and observations turn into restricted ideas about one's abilities and assigned roles. As a result, judgements and prejudices are formulated against a particular group and this can affect people in different ways (Eagly, Wood, & Diekman, 2000). First of all, stereotypes have been proven to impact and influence people's way of thinking (Heilman, 2001). Secondly, gender stereotypes can create "prompt bias in evaluative judgements of women even when these women have proven themselves to be successful and demonstrated their competence" (Heilman et al., 2004, p. 416). More specifically, if people see that a particular group usually engages with certain activities, people perceive these attributes and abilities as typical of a certain group. For instance, if people observe women caring for children, then it is likely that they believe that these characteristics are typical of women only (Eagly, Wood, & Diekman, 2000).

Therefore, people can create female stereotypes and thus begin to believe that women are the only ones who are able to carry out some activities such as nurturing children (Eagly, Wood, & Diekmann, 2000). The creation and the spreading of gender stereotypes can form a risk for our society. More precisely, they can create social limits for a particular group, men or women can be seen as able to possess only certain abilities and hence carry out only specific roles and job positions (Judge & Robbins, 2015). In other words, the acceptance and diffusion of stereotypes among people can lead to bias in evaluating one's competences and abilities. Anand (2013) argues that gender stereotypes can be especially harmful by creating a patriarchal society characterised by notions of female inferiority.

In particular, stereotypes of gender in the usage of technology can have a significant impact on occupational segregation, by presenting technology as a male-dominated field and discriminating against women (Gregory, 2003; Goodall, 2012; Anand, 2013). Different studies have argued that technology is a male-dominated field (Wajcman, 1991). Men are considered the only ones able to have high computing skills and having a deeper understanding of the usage of CTD than women (Edwards 1997; Turkle, 1984; Thomson and Zebrinos, 1995; Audrey and Harrison, 2004). Consequently, gender stereotypes in relation to technology can be a threat for women in search of particular jobs in which high technical skills are required (Steele & Aronson 1995; Steele 1997; Spencer, Steele & Quinn, 1999; Cooper, 2006). With the increasing prominence of technology in society, an analysis of gender differences and stereotypes in the usage of CTD is extremely timely and relevant. In the next paragraph I will be discussing the approach used in this research, hence social role theory will be explained.

Social role theory

Social role theory emerged in the 1980s, aiming to comprehend how the similarities and differences in social behaviour are created by society and more importantly their causes (Eagly, 1987). According to this perspective, the concepts of gender and sexuality are not strictly linked to personal identities, but also to social identities (Howard, 2000). Eagly et. al. (2000) argued that the concepts of gender and sexuality are created through our relationships with other people, and they depend on social interaction and social recognition (Eagly et. al., 2000). Accordingly, they can have an impact on how we understand ourselves in relation to others and gender roles.

Moreover, the social role perspective recognised the historical division between genders created by shared expectations of activities carried out by men and women (Eagly, 1987). For instance, it has traditionally been assumed that the responsibilities at home are typically handled by women, whereas men are supposed to be more accountable for activities outside home (Eagly, 1987). These shared expectations have been found to be passed on to future generations, thereby characterising and influencing social

behaviour of men and women today (Eagly 1987; Edwards, 1997; Eagly, Wood, & Diekmann, 2000). Males and females generally try to conform to these general shared expectations. For instance, men are inclined to be independent, assertive and competent compared to women (Eagly, Wood, & Diekmann, 2000). On the contrary, women are expected to develop and manifest communal or expressive behaviour, therefore being friendly, unselfish, and expressive (Eagly, Wood, & Diekmann, 2000).

The social role theory postulates that the acceptance and the intent to conform to these gender roles come from the socialisation processes. More exactly, “males and females learn how to develop certain skills that are conformed to their social roles” (Eagly, 2013, p. 124) from what is accepted by society. This implies that people might wonder about the ability of women in particular positions as, for instance, in leadership roles, whereas men who are considered as agentic can occupy leadership positions (Eagly, Karau & Makhijani, 1995). These shared expectations about gender roles are flexible because they depend on the immediate role of individuals. However, these can result in gender stereotypes, specifically when people perceive these expected behaviours as how a woman or a man *should* behave (Eagly, Wood, & Diekmann, 2000; Williams & Best, 1982).

This perspective entails ideas about gender roles as socially constructed. In this regard previous research done by Vogel et al. (2003), Fuegen et al. (2004) and Hoobler (et al.,2009) used social role theory with the aim to develop an understanding of “the shared expectations” about gender roles in our societies (Eagly, Wood, & Diekmann, 2000, p. 127).

Social role theory is the most followed perspective by academics in analysing gender stereotypes. For instance, Fuegen et al. (2004) applied it in order to analyse gender stereotypes in the workplace. Another similar study aimed to investigate the existence of gender stereotypes in managers’ opinions about female and male employees (Hoobler, Wayne & Lemmon, 2009). Moreover, social role approach has been very valuable in exploring the representation of gender roles in television. For instance, Signorielli & Kahlenberg (2001) applied it on examining gender roles in prime-time-television programming. They stated that the “social roles assigned to female and male characters by storytellers are tremendously important contributors to the construction and maintenance of gender stereotypes”. In addition, as Jones (1991) argued, the main problem is that most people do not even realise that mass media are maintaining stereotypical ideas. Therefore, analysing the persistence of gender stereotypes in mass media is very valuable and relevant in order to have an understanding of the dominant ideas in it.

An especially interesting medium to study the persistence of gender stereotypes is television. Signiorelli and Kahlenberg (2001) affirmed that among all types of media television, in particular, has a large influence on the construction and maintenance of gender stereotypes. Firstly, television has a significant role in spreading messages and creating meanings (Gerbner et al., 2002). Different scholars defined television as a “storyteller” (Gerbner et al., 2002; Linebarger & Piotrowski, 2009), because it has

the role of creating meanings and beliefs about our society. Indeed, television is an important tool for sociological research, because it gives a scenic display of our society and thus the representation of gender in relation to technology. Secondly, popular TV programs play an important role in our enculturation (Gebner, 1998; Signorielli, 2009). As a consequence, television reflects and reinforces dominant societal norms and cultural beliefs (Croteau & Hoynes, 2013). Thirdly, television, mainly, is an “important source of information about gender roles”; people’s concepts about gender can be influenced by the images they see on television (Gerding & Signorielli, 2014, p. 43). Television offers an opportunity for audiences to observe and identify themselves with the characters and create meanings about gender roles. Indeed “the content of gender stereotypes arises from perceivers’ observations of people’s activities” (Eagly & Steffen, 1984, p. 749).

However, it is argued that in some cases television programs can even provoke cultural harm, because they can create false and restricted ideas about the world (Signorielli & Kahlenberg, 2001). As several studies have shown and discussed, when television programs present rigid gender stereotypes, they can have a negative impact on our society (Lauzen, Dozier, & Horan, 2008, Signorielli, 2009; Signorielli & Kahlenberg, 2001). Signorielli and Kahlenberg (2001) affirmed that “through long-term exposure to television, viewers’ career choices may suffer. The message seems to be that women cannot have higher status and better paying jobs and maintain a successful marriage” (p. 20). Therefore, it is extremely important for sociologists to understand how these stereotypes are developed as well as how this changes over time. In the next paragraphs, an overview of previous research about gender stereotypes in relation to technology will be presented.

Gender stereotypes in the usage of technology

Gender stereotypes in technology advertisements

Different academics studied the representation of gender in media, such as Signorielli (2009). However, even though there is some research done about the relationships among gender and technology, the studies on this topic have solely focused on advertisements.

Previous research about tech advertising found that gender stereotypes are deeply embedded in technology, where men appear more likely than women to have excellent technological skills (Sismondo, 2011). In addition, men are usually portrayed as the only ones able to gain pleasure from tech devices and being highly skilled in using technology (Edwards, 1997; Turkle, 1984). From engineers to hobbyists, “men often have love affairs with their favourite technologies” (Sismondo, 2011, p.75). According to previous studies, men are represented in advertisements as more confident in using technology than women (Thomson & Zebrinos, 1995; Audrey and Harrison, 2004; Gerding & Signorielli, 2014).

Knupfer (1998) points out several gender-based stereotypes in technology advertising. One of the major stereotypes is about the setting in which technology is used (Knupfer, 1998), which has been assessed by different academics (Bolinger, 2008; Döring & Pöschl, 2006). Previous studies showed that there are certain *feminine* and *masculine stereotypes settings*: the *feminine* ones characterised to be for instance households, relaxing decoration. In advertisements, women usually are portrayed in bathrooms, kitchens, living rooms, backyards, having homemaking roles. Whereas, the *masculine* settings are usually work, sport, out-doors (Knupfer, 1998; Döring & Pöschl, 2006). Thus, the following hypotheses can be formulated:

H1: The setting in which characters are using CTDs differs by gender:

H1a: Men when using CTDs are presented more often than women in public settings such as: workplace or outdoors;

H1b: Women when using CTDs are presented more often than men in private settings such as household.

Furthermore, gender stereotypes are often intensified in electronic communication with men more likely to take the control and women more likely to use supportive styles of speech (Adam, 1998; Kember, 2003). Most studies about tech advertising show that men usually are portrayed in “authority roles”, as the only ones able to use technology (Knupfer, 1998). Moreover, men are often represented in an “agentic” and “advisory” role and able to use technology in a productive way (Knupfer, 1998). When depicted in the same or corresponding type of technology advertisements as men, women were shown in supportive or subordinate *roles* (Bolliger, 2008; Furnham & Paltzer, 2010). In contrast to men, women are often presented in tech advertisements with few skills and in some cases explicitly asking men how to use a technological product (Knupfer, 1998; Furnham & Paltzer, 2010). In addition, in tech advertisements men are usually advising women about the new household cleaning products, by implying that women are disempowered even in the home. In addition, Basfrinisci (2014) argues that “advertisements exaggerate the difference on some points and insist on depicting the stereotypical gender role and little progress of women” (p58). Still, Basfrinisci (2014) affirmed that even though in reality gender roles have changed, in advertisements the theme of men at work and women at home seem to be dominant and unchanging. This study provides a real-life example of how stereotypes can be used effectively in creating efficient advertisements and commercials by exploiting the customers’ perceptions towards the similarity between the stereotypes and their self-images. Thus, the following can be expected:

H2: The type of role that characters have in using CTDs differs by gender.

H2a: Men, when using CTDs, are presented more often in a leading role than women

H2b: Women, when using CTDs, are presented more often in follower role than men.

In addition, Dilevko and Harris (1997), concluded, based on a quantitative content analysis about how men and women are portrayed in high tech product advertisements, that there is an active and passive dichotomy based on gender. More precisely, the newspapers' advertisements try to convince the readers that "new tech products" are "used" more by men whereas women are users who, apparently, cannot comprehend the complexities of technologies (Dilevko & Harris, 1997). According to this view, the use of new and old generation devices differs by gender. It can be assumed that men in *Mr. Robot* use new and technologically advanced devices such as laptops and tablets, whereas women use less sophisticated ones such as mobile phones, showing a clear distinction between old and new technologies in relation to the type of device. The newest devices are tablets that started to be popular among consumers around 2005, laptops around 2000. The oldest are mobile phones, started to be consumers' products at the end of 90s and computers at the beginning of the 90s. Accordingly, it can be presumed that:

H3: The type of device that characters use differs by gender.

H3a: Men are presented using new CTDs such as tablets and laptops more often than women.

H3b: Women are presented using old CTDs such as mobile phones and computers more often than men.

Another related study (Bollinger, 2008) extended what Dilevko & Harris (1997) had already found and affirmed that mass media advertising communicates biases and stereotypes pertaining to gender, race, ethnicity, and technology (Bollinger, 2008; Knupfer, 1998; Dilevko & Harris 1997). There are certain advertisements aimed only at women and men. For instance, an example of a technological device targeted in particular to women is the Dell computer called "Della" (in 2009). It was a new and colourful notebook "for her". It contained tools such as a calorie counter and enables to store favourite recipes. The advertisements for this product implied a stereotype about the products' colour used by females (Casserly, 2009; Eisenstein, 2012). Therefore, in analysing *Mr. Robot*, the following hypotheses are formulated:

H4: The CTD's colour that is used by characters differs by gender.

H4a: Men are presented more often with white and black CTDs than women.

H4b: Women are presented more often with colourful CTDs than men.

Hacker culture predominately masculine

Different scholars affirm that technology implicitly sets a gender dimension in which men are seen more inclined towards and expert in the use of technology (Oldenziel, 1999; Kleif & Faulkner, 2003).

Accordingly, hacker culture is argued to be predominately masculine (Adam, 2005). Indeed, there is a considerable amount of literature on the relatively low numbers of women presented in “computing and IT, compared to administrative and secretarial roles where women predominate” (Adam, 2005 p.129).

Moreover, Adam (2003) affirmed, by conducting an analysis of the male domination of hacking, that hacking culture is young, male, technologically oriented, and on the margins of the computing industry. Furthermore, Wajcman stated: technology “currently reflects a man’s world, the struggle to transform it demands a transformation of gender relations” (1991, p. 166). Hacking and the use of ICTs and technology, as argued by previous studies, is strongly linked and identified with a male-dominated world (Jordan and Taylor, 2004). Therefore, we should expect to find several masculine stereotypes in *Mr. Robot*, as it is particularly about hacking. Hence, it can be predicted that there are more males who use CTD for hacking, due to the stereotype that is a predominantly masculine skill. On the basis of this and the accompanying literature, it can be predicted that:

H5: The kind of actions in using a CTD differs by gender.

By applying the social role theory, it is abundantly clear that the “shared expectations that apply to individuals on the basis of their socially identified sex” (Eagly, Wood, & Diekmann 2000, p. 127) in the usage of technology, portray masculine stereotypes. Specifically, in mass media technological skills are represented to be masculine ones, whereas women are portrayed as dis-empowered and not inclined to be confident with using technology (Dilevko, 1997; Bollinger, 2008). However, considering there is a lack of studies about the relationship between gender and the usage of technology and therefore the possible gender stereotypes (Wajcman, 1991), the current research aims to contribute to this body of knowledge. The study intends to address these gaps in existing literature through a content analysis of the representation of gender in the usage of CTD in a cyber TV drama.

Methodology and results

Design and sampling

A quantitative content analysis of the first season of *Mr. Robot* was conducted in order to understand how gender stereotypes are represented in the use of CTD. Previous authors have described that “one key goal

of content analysis is to examine whether media have characteristics that might influence users' attitudes and behaviours, either negatively or positively" (Collins, 2011, p. 292). Therefore, this method is suitable for the objective of this research.

The choice of focusing on this particular TV series is motivated by its topic that is technology. The story deals with Elliot Anderson a young hacker that works in a computer security company during the day, and he becomes a vigilante activist in his free time. *Mr. Robot* has been described as one of the best TV dramas in representing our current tech age (Koblinjan, 2016). To explore how gender stereotypes in using CTD are represented in *Mr. Robot*, a content analysis of 10 episodes (the whole 1st season) was conducted. The episodes aired on the USA Network between June and August 2015 and each episode lasted for approximately 50 to 55 minutes. As most of the story is inspired by current events¹ the cyber TV drama is particularly relevant and in tune with our time.

The aim was to analyse the events in which the primary characters are using a CTD. In doing so, the focus of the analysis was upon three dependent variables (gender stereotypes in action, characteristics of devices and setting.), two control variables (occupation and social age) and one independent variable (gender).

Procedure

Content analysis method was applied in order to study gender stereotypes in relation to technology usage in *Mr. Robot*. In order to do so, four different steps were carried out following Neuendorf's (2002) suggestions about content analysis. In order to develop the observational process, its steps and units were delimited and defined. Firstly, the aim of the study was to analyse the events in which people were using a CTD. Specifically, with the term *event* I mean the moments in which each primary character was using a CTD, and therefore the focus of the analysis was not the plot but only how on the character was using a CTD. In the events in which the characters used more than one CTD at the same time, it was recorded as multiple events in which characters were using CTDs. Therefore, the events analysed in the program were the ones when the characters were using a computer, laptop, tablet or mobile phone. In this regard, one aspect to be considered in the observational process was that the events could vary considerably in terms of length of time. Hence, the events did not provide a constant unit of measurement for making comparisons across the whole program. However, this did not create a problem for the current study. Indeed, in the observational process, the aim was to analyse how each character was using a CTD and not the length of time spent on it.

¹In particular to "Anonymous" group, the decentralized online community of political activist hackers (hactivists) around the world.

Secondly, the selected characters were analysed several times during the observational process in such a way that their behaviours and interaction with CTD were independently coded. Therefore, the steps in the observational process were to: 1) select the characters to be observed; 2) count the events in which each character was using a CTD; 3) record for each event, each variable and its indicators (Appendix 1 shows the observational coding book used in analysing *Mr. Robot*).

Dimensions of gender roles

In the analysis three dimensions of gender roles were recorded. One, referring to the actions entailed by the character in using CTD. Two, the characteristics of the device and three, the setting were analysed.

1. Action

Action is composed of three variables, including:

a) Kind of action: the specific action carried out by the character in using a CTD was coded. The categories in coding were: 1 for “calling”, 2 for “texting”, 3 for “emailing”, 4 for “working” and 5 for “hacking”. These kinds of actions are ranked from the easiest to the most difficult one.

b) Role in the action: 1 for “leading”, 2 for “follower”. Precisely, role in the action was categorised as the use of a technological device with a *leading* role or a *follower* role. This variable can be only assessed when at least two characters are using a CTD. Therefore, the role in the action was coded as *leading* when the character under examination was using a CTD and was in a primary position. For instance, a *leading* role was coded when one character was showing how to use a CTD and thus teaching another person how to do it. Whereas, a *follower* role means that the character does not have the major role in the event, for example, if a character was following someone else’s instructions. In all cases in which a character was using a CTD alone without the collaboration of anyone the *role* was not coded.

b) Ability in using technological devices: 1 for “un-technical”, 2 for “technical”. Following previous research (Audrey and Harrison, 2004; Gerding & Signorelli, 2014), the ability in using the technological devices according to the average ability in using CTDs, that is, how good is the character with technology was coded. Therefore, two categories were coded as: 1 for “un-technical”, when for instance a character showed difficulties in using a CTD and asked for help, and 2 for “technical” when a character was using a CTD with high skills, for example, if a character was using a computer with multiple monitors in order to carry out multiple tasks.

2. Device’s characteristics

The analysis was focused on the CTD’s characteristics as well, including:

a) Type of device: 1 for “mobile phone”, 2 for “computer”, 3 for “laptop” and 4 for “tablet”.

Previous studies about tech advertising showed that men were often portrayed with new advanced

technology. Therefore, I decided to include also the type of device and coded from the most technologically advanced newest device to use to the oldest and least sophisticated one.

b) *Device colour*: 1 for “black” 2 for “white” and 3 for “colourful”.

3. Setting

The setting in which characters are using a CTD was recorded. It was coded 1 for “household”, 2 for “work” and 3 for “other”.

Moreover, previous literature on gender stereotypes has highlighted the need for controlling occupation and social age (Signorielli & Bacue, 1999; Signorielli, 2009). Signorielli (2009), in her studies about the representation of gender and race in primetime television programs identified four classifications for jobs 1 for jobs that were “not prestigious” (household or service workers), 2 for jobs that were “neutral in prestige” (secretary, social worker, nurse, teacher, household worker, clerical, and others.), 3 for “prestigious” jobs (doctors, lawyers). Moreover, Signorielli (2009) classified the type of job as the following: 1 for “professional”, 2 for “white-collar”, 3 for “blue-collar,” 4 for “law enforcement” and 5 for “criminal”. Moreover, in a previous similar study, Signorielli & Bacue (1999) defined character’s age according to stages in the life cycle. Therefore, characters were classified as 1 for “children or adolescent”, 2 for “young adults”, 3 for “settled or middle-age”, and 4 for “elderly” (Signorielli & Bacue, 1999). Given the importance of those controls, they were measured and included in the analysis of this study. These variables, unlike the ones presented above, were constant and stable for each character.

Finally, the independent variable of this study is the gender of the main characters in *Mr. Robot*. Gender was coded once by unit (character) as 1 “male” or 2 “female” and was defined from the initial selection process.

Reliability

As a check on the reliability of the coding scheme, almost all the sample (seven episodes) was coded independently by two coders. Inter-coder reliability was assessed using Krippendorff’s alpha (De Swert, 2012). Only the variables “prestige” and “ability” had an alpha of .75. The variables “job”, “role”, “action”, “device”, “age”, “colour” and “setting” attained all an alpha of .89. In other words, the reliability of coding was high.

Analysis strategy

The analysis aimed to test the hypotheses previously formulated based on previous research about gender stereotypes in relation to the usage of technology. Therefore, *T-test* and *Chi-square* test were conducted in

order to explore the differences between each gender and the usage of CTDs. When the dependent variable had less than three categories the *T-test* was used and in the other cases the *Chi-square*.

Prominence of gender stereotypes in the usage of CTDs

In the analysis, a *T-test* and a *Chi-square* were used. Thus, in one part of the analysis through a *T-test*, it was examined whether the number of males and females in using CTD differs. Moreover, the aim was to answer the following question: *do male and females differ in using CTDs in terms of role and ability?*

Furthermore, the *Chi-square* test of independence was conducted to examine the relation between gender stereotypes and usage of CTDs. In other words, *does the use of CTDs differ by gender?* More specifically, *is the distribution of gender and CTDs use due to chance or is there a difference between the genders in using CTDs?* The variables “type of job”, “prestige” and “social age” were analysed in order to explore differences between genders in terms of social position. For the variables *prestige* and *age*, it was possible to calculate also the Fisher’s Exact Test, because some cells had low fills, thus it was possible to obtain an accurate result without approximations. Some categories were grouped because otherwise there would have been too few observations in them. In analysing the “type of job”, the categories *professional* and *white-collar* jobs were grouped together. The same was done for the “type of prestige”, *neutral* and *no prestige*. Finally, also in the “kind of action”, the simplest activities when using CTDs such as *texting*, *calling* and *emailing* were grouped together. Then there was the category *of working* and *hacking*. Other categories were not taken into consideration for the analysis because firstly, in the variable type of job, there were no characters in the course of the entire season that cast jobs as *blue-collar* or *law enforcement*. Secondly, in *Mr. Robot*, there were no *children or adolescent* and *elderly*. Regarding the type of device, not one of the characters used a tablet; thus this category was also left out. Table 1 reports the *T-test* results and the Table 2 the *Chi-square* findings.

Table 1. Differences in role and ability while using CTDs between genders (*N* =84)

	Gender	Mean	Standard deviation	<i>N</i>
<i>Role</i>	Male	1.86	.350	64
	Female		.503	20
<i>Ability</i>	Male	1.14	.350	64
	Female	1.65	.489	20

Table 2. Gender differences in the usage of CTDs in *Mr. Robot* (N= 84)

	Males characters rating	Female characters rating
Job		
<i>Professional, white-collar</i>	98.2%	60%
<i>Criminal</i>	1.8%	40%
Prestige		
<i>Prestigious</i>	14.3%	0%
<i>Not prestigious, neutral</i>	85.7%	100%
Age		
<i>Young adult</i>	81.3%	100%
<i>Settled adult</i>	18.8%	0.0%
Setting		
<i>Household</i>	26.6%	15.8%
<i>Work</i>	29.7%	31.6%
<i>Other</i>	43.8%	52.6%
Type of device		
<i>Mobile phone</i>	37.5%	65.0%
<i>Computer</i>	50.0%	25.0%
<i>Laptop</i>	12.5%	10.0%
Device's Colour		
<i>White, black</i>	90.6%	45.0%
<i>Colourful</i>	9.4%	55.0%
Action		
<i>Calling, texting, emailing</i>	31.3%	55.0%
<i>Working</i>	6.3%	15.0%
<i>Hacking</i>	62.5%	30.0%

The results from the *Chi-square* (Table 2) show that the relationship between *job* and gender was significant ($X^2(N=84) = 20.614, p = .000$). Men are more likely than women to be cast as professionals and in white collar jobs (98.2% of the men compared to 60% of the women). However, the number of criminals was higher for women than men (40% of women compared to 1.8% of the men). Secondly the relationship between *type of prestige* and gender was not significant ($X^2(N = 84) = 2.107, p = .147 F = .344$). Thirdly, the relationship between gender and social age was significant ($X^2(N = 84) = 4.375, p = .036 F = .061$), suggesting that in *Mr. Robot*, women are younger than men. Moreover, it can be noticed from Table 1 that in the entire season among the primary characters men who used CTDs were 64 and women 20.

The following results were related to the hypotheses formulated previously. First, it was predicted that the *setting* in which people are using a CTD differ by gender. From the *Chi-square* analysis, the relationship between gender and *setting* was not significant ($X^2 (N = 84) = 0.975, p = .617$). Therefore, the prediction (H1) according to which men when using CTDs appear more often in workplace and women in private setting as household is not supported.

Secondly, it was hypothesised, based on the theory, that men usually are represented with more technological skills than women. Accordingly, it was predicted (H2) that the *role* in using CTD differs by gender. The *T-test* results showed a significant difference in the *ability* in the scores for men ($M = 1.14, SD = 0.350$) and women ($M = 1.65, SD = 0.489$); $t(82) = 4.322, p = .000$. Moreover, *T-test* was conducted to compare the leading and follower *role* in using CTDs between genders. There was a significant difference in the scores between men characters ($M = 1.86, SD = 0.350$) and female ones ($M = 1.40, SD = 0.503$); $t(82) = 3.808, p = .001$. Thus, men were presented more in leading roles than women, whereas the latter were represented more in follower roles. Thus, hypothesis two is supported.

The relationship between *type of device* and gender was analysed. Previously it was hypothesised that the *type of device* differs in terms of gender (H3). The percentages seem to suggest that indeed men are represented more often with most advanced and difficult CTDs such as laptops, whereas women appear more often with less advanced and difficult CTDs such as mobile phones. However, the *Chi-square* showed that there was no significant relationship ($X^2 (N = 84) = 4.858, p = .088$). Although women appeared more often with mobile phones than men, there was a very little evident difference in using laptops. Another aspect which differed from the expectations previously made was that men used more computers than women. Thus, the results did not support hypothesis three.

Furthermore, the relationship between gender and the *device's colour* was tested. Previously it was hypothesised that the colour of a device differs in terms of gender indicating that males use more black and white CTDs and women more colourful ones (H4). The results showed that the relationship between gender and the *device's colour* was highly significant ($X^2 (N = 84) = 19.650, p = .000$). Thus, hypothesis four was supported. Moreover, hypothesis five stated that the *kind of action* in using a CTD differs by gender. The results show that there was a significant difference in the *kind of action* ($X^2 (N = 84) = 6.668, p = .036$). Looking specifically at the distribution of the character's percentage in hacking, it can be noticed from the Table 2 that there is a very high difference in the percentage of male hackers (62.5%) and female hackers (30%) thus supporting hypothesis five.

By considering those categories that make a statistically significant contribution to the value of *Chi-square*, it can be concluded that the majority of the hypotheses are confirmed. Moreover, the categories used in the *T-test* were all statistically significant. Therefore, these results mostly support the findings of previous studies.

Discussion and conclusion

The current study aimed to investigate gender stereotypes in the usage of CTD in the cyber TV drama *Mr. Robot*. This study attempted to extend the knowledge about gender stereotypes in relation to the usage of technology, considering that previous research has mainly focused on tech advertisements. For this purpose, the current research is an opportunity for exploring the existence of gender stereotypes in a different medium.

In answering the research question “*to what extent are gender stereotypes related to the usage of communication technological devices represented in the cyber TV drama Mr. Robot?*”, a quantitative content analysis was conducted. In the analysis variables not closely related to the usage of technology were also coded as: type of job, the related type of prestige and social age. The main goal was to understand the social position of the particular character under analysis. All these variables, except for the type of prestige, were significantly different among men and women characters. Results showed that men are more likely to be type-cast in jobs of a higher level in comparison to women. This finding is in agreement with previous research (Signorielli, 2009).

The results about the devices showed a considerable difference between male and female in using CTDs. These findings reinforce those of other studies (Oldenziel, 1999; Kleif & Faulkner, 2003, Adam, 2005) in different ways. First, in *Mr. Robot*, there are more men (64) using CTDs than women (20). This is in line with most of the literature that over time argued that women are highly under-represented in fields, such as computing and IT (Wajcman, 1991; Dilevko and Harris, 1997; Adam, 2003; Jordan and Taylor, 2004). Moreover, men are represented with higher skills and more confidence in using CTD than women. Indeed, the number of hackers is very much higher among men than women.

Furthermore, previous research found that women are presented in tech advertisements with low skills and in some cases asking men how to use a technological product (Knupfer, 1998; Thomson & Zebrinos, 1995; Audrey and Harrison, 2004; Sismondo, 2011; Gerding & Signorielli, 2014). Similar to the existing body of knowledge, the research showed that women were more presented in ‘follower’ roles than men. Another result included the relationship between gender roles and the colour of devices. This is in accordance with what previous research has highlighted, thus that advertisements target their products. More specifically, tech-advertisements adapt the technological devices to men and women, and in this way they establish, reinforce and spread stereotypes (Casserly, 2009; Eisenstein, 2012). For instance, the pink computer “Della” previously mentioned, implies a stereotype about the kind of products used by women. This was predominantly confirmed by the results by showing that the majority of the women use colourful devices, whereas men usually use white and black ones.

On the other hand, the analysis showed no significant difference in the kind of device and setting. According to the theory, there is a difference in representing men and women in using technology in

terms of old and new devices in advertisements (Bolinger, 2008). In other words, men are more often represented by using the most advanced devices, whereas women with the oldest (Dilevko & Harris, 1997, Bolliger, 2008). This hypothesis was not confirmed at all by evidence. However, this outcome is highly influenced by the fact that men are more likely to be hackers and for hacking, it is more common to still use computers, albeit the most advanced models. Thus, this shows a new result not predicted before: computers are not “old-fashioned” because they are generally able to do more than laptops and thus more difficult kind of activities (e.g. hacking).

Moreover, previous research about gender stereotypes in relation to the usage of technology argue that the most prominent differences are portrayed in the setting. Specifically, there are certain *feminine* and *masculine stereotypical* settings (Döring & Pöschl, 2006). However, this particular study showed the contrary. This one outcome is very interesting; women when using CTDs are more often at work (typical *masculine* setting) instead of at home (typical *feminine* setting). Whereas, men when using a CTD are more often represented at home than women. This aspect can be explained by the fact that most of the events were focused on F-society (the hacker group) and the principal character Elliot who founded the criminal cyber organisation. Thus, most of the scenes were focused on hacking. This particular kind of action could not be done at work or outdoors, but indoors ones such as Elliot’s house and the old games room, typical location where F-society is used to meeting and “hacking”. This is an interesting result because this shows that the male use of technology is no longer restricted to “work” setting, as previous research has argued, but also to the domestic one. Therefore, the setting in *Mr. Robot* is no longer gendered.

Overall, this analysis found that in *Mr. Robot* there are differences in male–female distribution in using CTDs. Specifically, women represent the minority group in using CTDs for difficult kinds of action, such as hacking. Men appear as the only ones able to use CTDs with very high skills whereas, women usually use CTDs more for calling or texting, hence for simple actions. Thus, in the usage of technology masculine stereotypes are represented. Men are in most of the cases portrayed as the ones able to carry out activities and work with technological devices, whereas the majority of women characters are shown as dis-empowered and not inclined to be confident with technological devices. Accordingly, the figure of the hacker is closely linked to a masculine image; there are more men hackers than women.

However, the research findings have a few implications for the issue of gender equality as well. More specifically, the striking result regarding the setting. Contrary to findings of previous research (Bolinger, 2008; Döring & Pöschl, 2006), in *Mr. Robot* there are no longer masculine and feminine stereotypes about the setting. In the majority of the cases females while using CTDs are not presented at home (typical feminine setting), differently from what was previously predicted women are very often represented at work places instead of at home. Whereas, men while using CTDs are very often portrayed

at home instead of outdoors places. This introduces a new representation of gender in relation to the usage of technology. This particular aspect suggests more equality between genders which reflects the changing role of women in most societies. Thus, the representation of gender in relation to the usage of technology here is not completely masculine.

To sum up, what shines through the quantitative content analysis of *Mr. Robot* is that gendered stereotypical ideas about technology usage are generally represented. Consequently, the gap between genders is reinforced, with the only exceptions of the setting and kind of device. As a result, the representation of gender related to CTD's use can impact the audience's perception about which are the most appropriate abilities of men and women and consequently create prejudices. In addition, as argued by different scholars such as Eagly, (1987) Venkatesh & Morris (2000), and Signorielli (2009) the spread of gender stereotypes negatively influences someone's performance. Thus the dissemination and the acceptance of these stereotypical ideas might discourage women to work, for instance, in ICT where expertise in technology is required (Venkatesh & Morris, 2000).

Nevertheless, this study has some limitations. For instance, one of them being in the sample size. This research was only focused on one TV drama. For future research, it would be interesting to extend the sample to more TV programs that focus on technology. Moreover, it would be very valuable to investigate the representation of gender in relation to the usage of technology in other contexts and not only hacker culture. Future research could delve deeper into other areas, for example by investigating the differences in everyday usage of technology of men and women, including the use of social media. Analysing gender stereotypes is valuable, and more specifically in relation to the usage of technology for different reasons. First, today both the concepts of gender and technology are vital, we must be concerned and eager to study the impact of the images given by media of gender roles and the usage of technology. Technology is a fundamental part of our everyday life, it is part of our education, social life and work. Therefore, restricted and distorted ideas (Eagly, 1987) about which group of people is suitable to use technology can have a huge impact in our society. According to social role theory, the proximal cause of gender stereotypes is the different distribution of men and women into social roles, hence into the labour market.

Secondly, previous research only focused on technology advertisements. However, as argued by different scholars (Gerding & Signorielli, 2014), television is a very important medium that should be analysed. Because of images and scenes, it represents the relation of the role of one gender to the another gender. Last, but certainly not least, it is imperative for us to continue to try to assess how these images may be influencing viewers. As already mentioned, this study scratches only the surface in extending the knowledge about gender stereotypes in relation to the usage of technology.

In conclusion, it is important to mention that one must be concerned about the spreading of gender stereotypes in relation to technology. The images and concepts spread by media can be interpreted as propagating negative messages about women's ability to use technology and working with it. Therefore, more studies are needed to assess and raise awareness, on how these images are influencing viewers' perceptions of people solely based on their gender.

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Appendix 1. Study Variables and Observational Coding Book

Episode number	
Character name	
Gender	<ol style="list-style-type: none"> 1. Male 2. female
Occupation: type of job	<ol style="list-style-type: none"> 1. professional 2. white-collar 3. blue-collar 4. law enforcement 5. criminal
Occupation: type of prestige	<ol style="list-style-type: none"> 1. not prestigious 2. neutral in prestige 3. prestigious
Social age	<ol style="list-style-type: none"> 1. children or adolescent 2. young adult 3. settled adult 4. elderly
Kind of action	<ol style="list-style-type: none"> 1. calling 2. texting 3. emailing 4. working 5. hacking 6. other
Role in the action	<ol style="list-style-type: none"> 1. follower 2. leading
Ability in using CTD	<ol style="list-style-type: none"> 1. technical 2. un-technical
Type of device	<ol style="list-style-type: none"> 1. mobile phone 2. computer 3. laptop 4. tablet
Device's colour	<ol style="list-style-type: none"> 1. white 2. black 3. colourful
Setting	<ol style="list-style-type: none"> 1. household 2. work 3. other